WHAT IS CLAIMED IS:

1. A wavelength characteristic control device for controlling a wavelength characteristic of polarized light, comprising:

a polarized light wavelength characteristic changing element having the wavelength characteristic such that transmittances or reflectances of P- and S-polarized rays vary differently with respect to wavelength; and

polarization variable control means for subjecting a plane of polarization of the polarized light incident on said polarized light wavelength characteristic changing element to rotatory control to change a ratio of the P-polarized ray to the S-polarized ray, thereby variably controlling the wavelength characteristic.

2. The wavelength characteristic control device according to claim 1, wherein said polarized light wavelength characteristic changing element comprises a dielectric multilayer film.

3. The wavelength characteristic control device according to claim 1, wherein said polarized light wavelength characteristic changing element comprises a fiber fusion spliced device.

4. The wavelength characteristic control device according to claim 1, wherein said polarized light

wavelength characteristic changing element uses, as a wavelength region of the wavelength characteristic, a wavelength region in which a rate of change of transmittance with respect to wavelength is large.

5. The wavelength characteristic control device according to claim 1, wherein said polarization variable control means applies stress to a fiber loop to thereby variably control the wavelength characteristic.

6. The wavelength characteristic control device according to claim 1, wherein said polarization variable control means comprises a wave plate, the wave plate being rotated to thereby variably control the wavelength characteristic.

7. The wavelength characteristic control device according to claim 1, wherein said polarization variable control means comprises a liquid crystal.

8. A gain equalizer for actively equalizing a gain-wavelength characteristic, comprising:

polarized light separating means for separating polarized signal light;

polarization plane coincidence control means for making planes of polarization of a plurality of separated polarized rays coincident with each other, to thereby

generate first polarized light;

polarization variable control means for subjecting the plane of polarization of the first polarized light to rotatory control to change a ratio of a P-polarized ray to an S-polarized ray;

a polarized light wavelength characteristic changing element for generating second polarized light having a wavelength characteristic corresponding to the changed ratio;

polarization restoring means for subjecting the plane of polarization of the second polarized light to inverse rotatory control reverse to the rotatory control performed by said polarization variable control means on the plane of polarization of the first polarized light, to restore a polarized state identical with that of the first polarized light and thereby generate third polarized light; and

polarized light synthesizing means for synthesizing the third polarized light.

9. The gain equalizer according to claim 8, wherein said polarized light separating means separates the polarized signal light in which wavelengths are multiplexed.

10. The gain equalizer according to claim 8, wherein said polarized light separating means comprises one of a birefringent crystal and a dielectric multilayer film.

11. The gain equalizer according to claim 8, wherein said polarization plane coincidence control means rotates the plane of polarization of one separated polarized ray by 90 degrees to thereby make the planes of polarization coincident with each other.

12. The gain equalizer according to claim 8, wherein said polarized light synthesizing means rotates the plane of polarization of one polarized ray by 90 degrees and then synthesizes the polarized light.

13. The gain equalizer according to claim 8, wherein said polarized light synthesizing means comprises one of a birefringent crystal and a dielectric multilayer film.

14. The gain equalizer according to claim 8, wherein said polarized light wavelength characteristic changing element is capable of changing an angle of incidence of the polarized light.

15. The gain equalizer according to claim 8, wherein said polarized light wavelength characteristic changing element comprises a plurality of elements arranged for said plurality of separated polarized rays, respectively.

16. The gain equalizer according to claim 8, wherein said polarized light wavelength characteristic changing element comprises a plurality of elements having respective different wavelength characteristics and arranged in multiple stages.

17. The gain equalizer according to claim 8, wherein said polarized light wavelength characteristic changing element generates, as the second polarized light, reflected light reflected thereby.

18. The gain equalizer according to claim 8, wherein said polarization variable control means comprises a Faraday rotator.

19. The gain equalizer according to claim 18, wherein said polarization variable control means performs the rotatory control on the plane of polarization by changing a magnetic field applied to the Faraday rotator.

20. The gain equalizer according to claim 19, further comprising wavelength characteristic control signal generating means for sending out a wavelength characteristic control signal, which is an electrical signal for controlling the applied magnetic field, to control the wavelength characteristic.

21. The gain equalizer according to claim 20, wherein said wavelength characteristic control signal generating means generates the wavelength characteristic control signal in accordance with wavelength characteristic data which is a result of measurement by a light measuring device to which the signal light is input.

22. The gain equalizer according to claim 20, wherein said wavelength characteristic control signal generating means generates the wavelength characteristic control signal in accordance with wavelength characteristic data which is a result of measurement by a light/electricity converter which converts the signal light to electrical signals according to wavelengths.

23. The gain equalizer according to claim 8, wherein said polarized light separating means comprises an optical splitter/coupler having a splitting ratio which is variable and yet independent of the polarized light.

24. The gain equalizer according to claim 23, wherein said polarized light wavelength characteristic changing element comprises optical elements having different wavelength characteristics and transmitting therethrough split light rays, respectively.

25. The gain equalizer according to claim 8,

wherein a polarization-independent isolator is arranged in a space beam between an input fiber lens and said polarized light separating means or between the input fiber lens and an output fiber lens.

26. The gain equalizer according to claim 8, wherein optical splitting means for splitting light is arranged in a space beam between an input fiber lens and said polarized light separating means or between the input fiber lens and an output fiber lens.

27. The gain equalizer according to claim 8, wherein wavelength multiplexing means for multipl xing wavelengths is arranged in a space beam between an input fiber lens and said polarized light separating means or between the input fiber lens and an output fiber lens.

28. A light amplifier for amplifying signal light and actively equalizing a gain-wavelength characteristic, comprising:

amplifying means for amplifying the signal light;

polarized light separating means for separating the amplified signal light;

polarization plane coincidence control means for making planes of polarization of a plurality of separated polarized rays coincident with each other, to thereby generate first polarized light;

polarization variable control means for subjecting the plane of polarization of the first polarized light to rotatory control to change a ratio of a P-polarized ray to an S-polarized ray;

a polarized light wavelength characteristic changing element for generating second polarized light having a wavelength characteristic corresponding to the changed ratio;

polarization restoring means for subjecting the plane of polarization of the second polarized light to inverse rotatory control reverse to the rotatory control performed by said polarization variable control means on the plane of polarization of the first polarized light, to restore a polarized state identical with that of the first polarized light and thereby generate the third polarized light; and

polarized light synthesizing means for synthesizing the third polarized light.